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AUGUST 12, 1950

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Backstage with Jets

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NUCLEAR PHYSICS

From Now On: The Atom

A law which will apply to the universe and to the submicrocosmos is in the offing. New concepts for the study of the atom will be introduced.

By WATSON DAVIS

Twenty-first in a series of glances forward into science.

► THERE really are "two worlds" among the atoms. The laws that govern the universe down to the fringes of the atoms themselves do not hold good in the hearts or nuclei of the atoms.

No puzzle is more troublesome just now than to try to figure out the action within this terrifically concentrated atomic core, made up of protons and neutrons. An assorted variety of other particles, called mesons, appear and disappear in nuclear collisions.

Just visualizing the atom is a strain upon the imagination. Suppose it is enlarged a billion times. The empty space in which the electrons roam would be about the size of a basketball. The familiar idea is that these electrons are like planets in a solar system. The nucleus, or core, would be a tiny grain of sand. Yet the bulk of the matter of the atom—and the universe—is in the nuclei, for each proton and neutron is nearly two thousand times the mass of an electron. There are in general as many electrons in the outer part of the atom as there are protons within. This balances the charges—positive for the protons and negative for the electrons.

The neutrons are electrically impartial, unattracted by matter. Theoretically they go on for immense distances once they get started, and almost all matter is "transparent" to them. The neutrons are the trigger particles of the uranium-plutonium fission atomic bombs. They explode a fissionable atom when they hit it. They start the action that changes mass into energy. That is one of the reasons that such attention is being paid to them.

Containing the bulk of the mass of the universe, the nucleus is the prime atomic powerhouse. Immense particle accelerators, flinging fragments of atoms at energies of billions of electron volts, are being built to attack it and learn its actions and secrets. Immensely curious about the practical as well as the theoretical results of such experiments, the Atomic Energy Commission is investing millions of dollars in such atom smashers, each with a special kind of job.

The cosmic rays have energies higher than those produced by any machine now building and any man can hope to build. Scientists, with aid of balloons and high places, arrange for thousands of photographic plates to be exposed to catch in-

frequent but revealing atomic smashes.

Some of the most advanced mathematical physics is directed toward the problem of the nucleus—the "core" problem of modern physics. To a non-mathematician what is written in formulae is unreadable. The theory is usually beyond most experimental physicists.

There is quantum electrodynamics which is concerned with the interaction of the electron, the particle of electricity, with radiation. This idea stems from Dr. P. A. M. Dirac, modern English physicist, and works out well, but the older Maxwell the-

ASTRONOMY

"Shooting Star" Month

► THIS month is one of the best months of the year to look for "shooting stars" flashing across the night sky.

This is because the Perseids, the most conspicuous and dependable of the annual meteor showers, are visible during the first two weeks in August. The rate of seeing these brilliant "tracer bullets" from space increases slowly to Aug. 12, then falls off rapidly.

Most of the meteors will appear to radiate from the constellation of Perseus which rises in the northeast about midnight.

It is expected that about 50 "shooting stars" per hour can be seen on the night of Aug. 12 after midnight. Throughout the year the average for a single observer under the best conditions is ten an hour.

Since any one person's field of view is limited, there are actually many millions every night visible over the entire earth's surface. Smaller meteors, not visible to the naked eye, would considerably increase this total.

This year, fortunately, excellent observing conditions will prevail for the height of the shower. New moon occurs on Aug. 13 in the United States, and therefore the moon will not be visible on Aug. 12.

The frequency of seeing meteors increases after midnight. The reason that more can be seen after midnight is that in the evening we are on the following side of the earth with respect to its revolution. We are, therefore, protected from the meteors, except those that overtake us.

In the morning we are on the forward side fully exposed to the bombardment from space.

Although these meteors are actually mov-

ing in parallel paths, they will seem to come from a point, because of the perspective. The same effect is given, for instance, by far-away railroad tracks that seem to converge to a point in the distance.

For the future, you may expect:

A. New particles that will be considered "fundamental" or "elementary" in the sense that they have existences, no matter how fleeting in the nucleus of atoms. These may be more mesons, entities that seem to "play" catch, as one scientist put it, among the more lasting protons and neutrons.

B. The larger atom-smashers now building with their immense energies may so explore the heart of matter that the way the nucleus is put together will be better understood, bringing the possibility of more atomic transformations of practical importance.

C. A mathematical concept or law that will apply to the universe as a whole as well as to the submicrocosmos of the atom will be worked out.

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ing in parallel paths, they will seem to come from a point, because of the perspective. The same effect is given, for instance, by far-away railroad tracks that seem to converge to a point in the distance.

Meteors are solid, swiftly moving bodies, fused and mostly consumed in their flight through the upper atmosphere. Their trails are of very short duration, but their trains, hollow cylinders of phosphorescent expanding gases, are visible from a few seconds to as much as half an hour.

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On This Week's Cover

► THE new jet propulsion laboratory which has recently gone into operation at Beacon, N. Y., is believed to be the first large industrial jet laboratory to be financed entirely from private funds.

On this week's cover of SCIENCE NEWS LETTER, exhaust gases from gas turbine combustion, traveling at speeds of 1,000 feet per second and reaching temperatures of 1,600° Fahrenheit, turn exhaust pipe into brilliant cherry red color in nighttime jet research. Specially constructed quartz windows permit the scientists to study the combustor interior.

The new laboratory, owned by the Texas Company, can be used to test not only petroleum components but a wide range of organic and inorganic chemicals which possess remarkable power characteristics.

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MEDICINE

Life-Saver from Burns

Cortisone may prove to be stop-gap aid for the exhaustion of the adrenal gland which occurs in severe burns.

► CORTISONE, adrenal gland hormone famous for its beneficial effect in arthritis, may prove life-saving in cases of severe burns.

The death rate can be halved if this hormone is given along with treatment for shock during the first critical days after the burn, it appears from studies by P. O. Crassweller, Dr. A. W. Farmer and W. R. Franks of the Royal Canadian Air Force Institute of Aviation Medicine and the Hospital for Sick Children of Toronto.

Their studies were made with mice. Because of the scarcity of cortisone itself, they did not use the pure hormone. Instead they extracted material with cortisone activity from human urine.

This was injected twice daily for the first four days after the burn in one group of 69 mice. These mice also were given serum albumin to control shock. The death rate for these mice after eight days was about 15%. Another group of 69 mice were given albumin for shock but no cortisone. At the end of eight days, more than twice as many of this second group, over 30%, were dead. And among mice that got no treatment for their burns, between 40% and 45% were dead at the end of the eight days.

Among the mice that died, the untreated ones survived, on the average, only eight hours. Those that got treatment for shock survived for 12 hours. Those that got cortisone plus shock treatment survived 19 hours.

Treatment for severe burns, the scientists point out, has improved greatly during recent years, due to new drugs for treating infection and plasma and albumin for overcoming shock. But there are still patients who recover from shock and have no infection, but die between the third and tenth days after the burn. This period is called the "toxic" period and there has so far been no satisfactory treatment for it.

These deaths, the scientists think, are due to exhaustion of the adrenal gland. The exhausted gland can no longer make enough cortisone. Giving the hormone would help tide the patient over this critical period until his own gland has recovered and can function again.

ACTH, cortisone's twin for arthritis treatment, would not help because this hormone, from the pituitary gland, acts by stimulating the adrenals to produce cortisone. If the adrenals are already exhausted, ACTH could not help and might make matters worse.

If cortisone is used for burn patients, the scientists warn, doctors must be careful not to give too much, particularly if the patients will need early skin-grafting operations.

Details of the study are reported in the BRITISH MEDICAL JOURNAL (July 29).

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PHYSICS

Universe Very Much as Now At End of First Half Hour

► THE first half hour of the life of our expanding universe found the world well started toward its present makeup, Dr. George Gamow, theoretical physicist of George Washington University, suggests in a report to the American Institute of Physics, published in its journal, Physics Today (August).

Combining the mathematics of Einstein and the new information on how heavy atoms can be built up by combinations of neutrons and protons which has come from atomic energy studies, Dr. Gamow projects the line of development backward to the beginning of time as we know it. He deduces a very dense hot gas which began to expand sometime between one and four billion years ago.

Borrowing from the dictionary an extinct word "ylem" for this hypothetical material, he traces its expansion from the billions of degrees temperature with which it started, and the combinations of its neutrons and protons into the elements which make up the universe today.

Half an hour is enough time, Dr. Gamow calculates, to account for the small amount of uranium in the universe, in contrast to the large quantities of hydrogen and helium throughout the atmospheres of the stars. He finds no end to the expansion of the universe into infinity.

By collision of two particles at a time, Dr. Gamow can account for formation of the light elements through helium. There is a gap in the elements because helium, whose weight is 4, comes next in order to beryllium whose weight is 6. There is no element with atomic weight 5, although all other weights are represented among the elements.

Dr. Gamow thinks it more likely that a now unknown kind of carbon, mass 10, once existed, formed by collisions of lithium 6 successively with four neutrons or beryllium 7 with three neutrons one after the

other. Aside from this difficulty the formation of all the elements, in about the quantities that now exist in the universe, can be explained by processes now known.

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ASTRONOMY-ENGINEERING

Meteor Trails Trace Winds 80 Miles Above Earth

► HIGH above the earth where only meteors and rockets are able to signal what is happening, there are variable winds ranging from a brisk 30 miles per hour to gales of 125 miles per hour.

These wind observations at 55 to 80 miles altitude have been made by a new electronic method of analyzing the drift of meteor trails devised by L. A. Manning, O. G. Villard, Jr., and A. M. Peterson of Stanford University's Electronics Research Laboratory, financed by the Office of Naval Research.

Meteors are small particles of matter that come into the earth's outer atmosphere and burn with a flash. They cause electrical disturbances due to their heat and these meteoric "smoke puffs" are efficient reflectors of radio waves and may be detected by radar-like method.

Although these disturbances last only a second or two, they drift like a smoke puff in the outer atmospheric winds, allowing them to be measured.

Knowledge of high altitude winds promise to help engineers designing rockets for peaceful or war purposes. Meteorologists



"SMOKE PUFFS" RECORDED—
Prof. L. A. Manning of the Stanford Electrical Engineering Department examines a paper tape recording of the drift of meteoric "smoke puffs" detected by radio equipment. The drift gives clues to the speed and direction of upper atmosphere winds.

will use the new information in making weather forecasts, since facts gathered by balloons come from a level only about half as high.

MEDICINE

Benemid against TB

► BETTER treatment for tuberculosis is expected through use of a new chemical called Benemid. The new chemical will step up the effects of PAS, a remedy already giving some beneficial results in treatment of the white plague.

Studies showing the possibilities to be expected from teaming these two chemicals are reported in Philadelphia by Drs. William P. Boger and Forrest W. Pitts of the Philadelphia General Hospital.

PAS, short for para-aminosalicylic acid, is being applied increasingly to the treatment of tuberculosis. It is sometimes used in conjunction with streptomycin. But the dosage of PAS now used, the Philadelphia scientists pointed out, is based on the amount the patients can tolerate, not on what is believed the optimum dose. Some TB specialists believe twice the dose now used would be desirable.

The Philadelphia scientists decided that PAS might be more effective if some way could be found of getting higher concentrations of it in the patient's blood without increasing the dose. One way might be to give a chemical that would slow its excretion from the body. Benemid seems to be the answer.

Tests on seven patients with tuberculosis showed that Benemid enhanced the concentration of PAS in the blood plasma two to four times.

"Therefore," Drs. Boger and Pitts state in their report to the journal SCIENCE

The technical report of the research is appearing in the PROCEEDINGS OF THE INSTITUTE OF RADIO ENGINEERS (August).

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normal, which means very little, but the far northwest will have precipitation somewhat above normal.

Temperatures will be lower than normal for the central and northern Rocky Mountain states. Along the Great Lakes and elsewhere in the west, temperatures will be their usual August selves.

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Streptomycin is found by one research group to be the best of eight antibiotics for the treatment of the radiation produced by the atomic bomb.

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What bird has royal status? p. 110.

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How is a key linked with marital happiness? p. 104.

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MINING

Manganese Lack Drastic

Importation of manganese ore from Russia was cut to practically nothing in 1949. Only about 10% self-sufficient, this lack is an Achilles heel in our military might.

► NOT enough tanks, not enough guns, not enough armor for aircraft carriers. This is the down-to-earth nightmare which a single item on the suddenly critical "strategic materials" list—the lumpy ore of a metal called manganese—has brought to the men planning national defense speed-up.

Few people outside the government and the steel industry know of a Russian embargo which cut off the U.S. from its major source of manganese more than a year ago—and the desperate efforts which have been taken since then to fill the gap.

Special railroad ore cars were sent to South Africa, transportation experts went to India last year, in the attempt to make up the 350,000-ton annual U.S. import of manganese ore from Russia. This was suddenly cut to a mere trickle early in 1949.

The gap was closed, but this country is still vulnerable, for only about 10% of the manganese needs of the U.S. steel industry can be met by U.S. mines. The rest must be imported over long sea lanes.

There is no substitute for manganese in making steel, particularly the tough alloys needed for modern weapons of war. More manganese goes into steel than any other metal other than iron itself. If the supply were suddenly cut off, American steel furnaces would cool and close down.

Russia is self-sufficient in manganese. The U.S., far from that happy state, has been trying to find ways to boost its own output. We have low-grade ore, but processing it is expensive. Few companies have been able to meet competition of imported ores. The Senate is considering a bill which would aid rapid development of our own deposits.

The U.S. Bureau of Mines last year did a lot of research on ways to recover manganese from the slag piles outside open-hearth furnaces. There is theoretically enough manganese in these waste heaps to make up the amount we formerly imported from Russia, and to make this country 50% self-sufficient.

Government geologists drilled tunnels into hot, dusty, waterless Artillery Peak in Arizona and found vast reserves of manganese. But again they were so low in grade as to be usable only in a real emergency.

If Russian submarines on the high seas were to create that emergency, the steel industry almost immediately would have to delve into U.S. stockpiles (how big these are is a secret). After they are gone, where the steel furnaces would get manganese for artillery and armor is the question now stalking the re-awakened American defense effort.

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top young scientific personnel. A significant proportion of scientific personnel is in the reserves.

Some manpower experts believe that, sooner or later, competition for personnel will have to be stopped and that a new federal agency will have to allocate men and women among all components of our war effort. They point to the lack of a backlog of unemployed, the high level of production and the foreseeably great needs of the military as reasons for believing that it will be sooner rather than later.

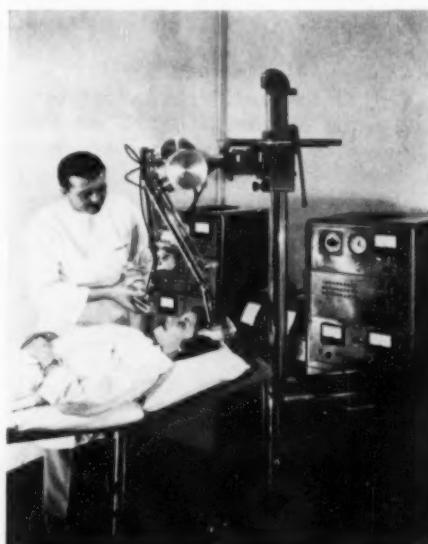
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MILITARY SCIENCE

Red-Conquered Korea a Dagger Confronting Japan

► IF Korea is completely conquered by Red forces, it will be a dagger pointed at the heart of American-occupied Japan.

History and geography show that Korea is by no means only an out-of-the-way place suitable for a preliminary testing of American strength and reactions. Ever since Japan came out from isolation in the 1860's, Korea has been the subject of a life and death struggle between Russia, China and Japan and the key to control of a vast



ATOMIC ROBOT—The "Isotron," a weird looking chromium monster with flashing lights and electronic brains, helps to pinpoint brain tumors which have baffled expert diagnosticians. Making skull incisions needless, the patient is simply given an injection of a radioactive isotope. The "tracer" accumulates in the tumor tissue and gives out messages which are received by two Geiger counter arms. Readings are taken at 32 spots and then the evidence is considered.

GENERAL SCIENCE

Manpower, Pro and Con

► PRESIDENT TRUMAN will soon be forced to decide a top-level quarrel between the Pentagon and the National Security Resources Board over the utilization of manpower, Science Service has learned.

Being dragged to his desk for decision are two schools of thought about the draft and the induction of reserve officers. Some influential top brass want as few deferments as possible, not caring whether the nation's laboratories and industries are stripped of precious scientific personnel. Leaders of science and NSRB Chairman Stuart Symington are working to see that skilled manpower is allocated to the job it can do best for the country, whether it be in service, in industry or in university laboratories.

In the opinion of those who are plugging for an all-out view of manpower rather than the Pentagon view, the manpower muddle has become worse instead of better recently.

The following things have happened, or have been prevented from happening:

1. A committee of Selective Service that spent the last three years drawing up a program for deferment of those physicists, chemists, biologists and others who would be of more use as civilians has seen its plan shelved until September at least.

2. Only a stop-gap plan to prevent calling up of key scientific personnel who are members of the reserve has been approved.

3. A long-range, overall manpower program being worked out by planners in the National Security Resources Board has been held up by the military.

4. Forces on both sides are preparing to go to the President.

It is even more likely now that many of our great industrial laboratories, upon whom we will depend for new weapons, will be denuded of up to one-third of their

area of Asia and millions of square miles of Pacific waters.

Willy-nilly, the United States, by occupying Japan, must take over Japan's attitude about Korea. Perhaps one reason we decided to fight the Communists in Korea was that, after five years of responsibility for Japan, we have absorbed Japan's long-held preoccupation with Korea as the key to Asiatic dominance.

Japan and China have fought and intrigued over Korea since recorded history began. In 1592 the Korea Straits, over which our troops in Korea are now being supplied, was the scene of the first of several historic naval battles in waters near Korea. There, after 300,000 Japanese troops had invaded Korea in an attempt to drive out Chinese influence, science defeated the Japanese. A Korean admiral invented the iron-clad ship and used several of them to sever the Japanese supply route and finally to defeat completely the Japanese effort to control Korea.

Today those same straits, little more than 100 miles wide, are the reason for anxious worry on the part of our admirals. Russian submarines and aircraft, based at both Vladivostok and Port Arthur in Manchuria, threaten American supply routes to our beleaguered troops in Korea.

Russia, China and Japan intrigued in a Korea bedeviled by a corrupt, autocratic government until 1894. China put troops in Korea. Japan put more troops in Korea. The Sino-Japanese war which resulted was decided, not by land fighting, but by a naval battle off the mouth of the Yalu River, which divides North Korea from Manchuria. Japan won.

Russia, Germany and France, in a triple intervention, however, wrested the fruits of victory from Japan. This "upstart" eastern nation was upsetting the balances es-

tablished by the western nations in Asia and was threatening to become a world power. Japan was forced to withdraw.

In the next 10 years Japan did emerge as a world power. What happened in Korea became important around the world. Britain signed an alliance with Japan. Japan's power became important as a factor in the pre-World War I relations between the European nations.

In those ten years, the cockpit was Korea. In a series of maneuvers too complicated to report, Russia and Japan contended for supremacy in Korea and Manchuria. The maneuvering led to the Russo-Japanese war of 1904-05 and one of the most decisive naval battles of modern world history—right in the Korean Straits.

Japan won again. She took over Korea completely. This time no alliance of European powers could wrest victory and dominance of Korea and Manchuria from her. This time her victory affected European affairs. Russia was demonstrated to be a weak power—no longer a brake on German ambitions. Japan was a power whose favor was to be sought. As a direct result she was permitted to take the mandated Pacific islands which our troops had to wrest from her in World War II.

In 1934 the contest between Japan and Russia had another test—a test which neither power was able to bring to a final conclusion. There were "border clashes" along the Manchuria-Siberia boundary.

Now, Russia has control of Manchuria and all of China. She has a modern navy, nothing like the two inept fleets which were successively defeated by Japan early in this century. We have replaced Japan as a power in Asia. But the contest is the age-old one—who shall control Korea.

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PHYSICS

Warning of Radiation

A "dosimeter" will help citizens to recognize dangerous levels of radioactivity and also will aid them in finding the best way out of the dangerous area.

► ATOMIC scientists in Pasadena, Calif., have invented a radiation "dosimeter" simple and rugged enough to be used by any one in a radioactive disaster area, small enough to be worn like a wrist watch or carried like a package of cigarettes.

Drs. Charles C. Lauritsen and Thomas Lauritsen of the Kellogg Radiation Laboratory at California Institute of Technology describe the proposed civil defense safety device in the journal SCIENCE (Aug. 4).

Their instrument is not being made in quantity; it is only a proposal. But in the semi-annual report of the Atomic Energy Commission, released recently, there is

mention of an "electrostatic dosimeter" invented by a scientist at CIT and reference to "further industrial development" of it.

In the world of the A-bomb and H-bomb, write the Lauritsens, "tremendous and altogether unprecedented quantities of dangerously radioactive substances can now be liberated in a single explosion, or manufactured in a nuclear energy plant and delivered in the form of radioactive poisons, producing radiation hazards of fantastic magnitude."

Their invention would equip the ordinary citizen with a way of recognizing dangerous levels of radioactivity and a sort of

radiation compass to find the best way out of the area of dangerous radiation.

A wheel similar to the winding stem on a watch provides the electric charge which powers the instrument. The level of radiation would be shown by the speed at which a needle crosses a simple dial.

Radiation is invisible and unfeelable. You can get a bad dose of it, even a killing dose, without knowing you are exposed. In atomic laboratories and A-bomb plants, workers carry photographic films and pocket instruments. But these must be checked by specialists at the end of the day. Other radiation instruments are delicate, complicated and expensive.

"It is conceivable that our armed forces have already developed satisfactory instruments (for civilian defense teams, rescue crews, etc.)," the California scientists say.

"But, for reasons that are not clear, such information is not available to the public. We can only proceed on the assumption that no fully satisfactory instrument for this purpose has so far been developed."

In the AEC report, six types of simple safety instruments for civil defense are listed as under development. None are available yet in any quantity, an AEC spokesman said.

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ENTOMOLOGY

War on Insect Pests Now Nation-Wide

► AS many as 35 airplanes a day, every day, are roaring low over Wyoming's grasslands and mountain valleys in an all-out war against the grasshopper.

Desperate Southern cotton growers are using poison dusts to battle billions of boll weevils.

The armyworm has marched over Maryland, Delaware, New Jersey, Pennsylvania and Virginia, and is attacking in Ohio, Oklahoma, Texas and California.

Reports such as these from the Department of Agriculture document the Battle of 1950 against the annual insect infestation, now in full swing.

Latest reports on the most numerous insect pests list the grasshopper, European corn borer, corn earworm, armyworm, alfalfa weevil, red mites, Mexican bean beetle, potato leafhopper, seed-corn maggot, Colorado potato beetle, potato flea beetle, cutworm, tobacco hornworm, boll weevil, cotton leafworm, cotton thrip and the screwworm as causing moderate to heavy damage across the nation.

Harried insect fighters have one comforting thought. It could have been much worse. Spring this year was cold and wet in many areas. Tremendous numbers of insect eggs which survived the warm winter were delayed and often reduced in numbers in hatching.

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PSYCHIATRY

Mental Disease Increases

Living under Communism has produced a great increase in mental illness in China. Workers are being steeped in the teachings of Marx, Engels, and Lenin.

► MENTAL illness has "remarkably increased" in China due to the rapid change of culture under communism, reports a Chinese psychiatrist in a letter to colleagues in this country.

The letter was not mailed in China and the name of the Chinese psychiatrist is being withheld at the request of his American colleagues to protect him from possible reprisal by the communist government in China.

The increase in mental illness, the Chinese psychiatrist reports, has been brought to the attention of the government and several psychiatric institutes will be organized.

"Based on Bolshevism, the revolution in China will affect the entire course of history and the traditional philosophy," reports the Chinese psychiatrist.

"Every worker is encouraged to study and learn the teachings of Marx, Engels, and Lenin. The idea is that unless one is well acquainted with these teachings and understands the historical development of society, he will be easily misled toward the wrong direction and also will not be able to handle his knowledge properly."

This extends to professional classes as well as workers. A month of such study is required in every college before the regular classes open. "Workers," presumably psychiatrists and other doctors, in the National Neuropsychiatric Institute must spend half of every day for two months in studying and learning Marxism, Leninism and similar writers.

"There is a tendency that psychiatry in China will be involved in revolution following the example of the Soviet Union and the characteristics of China," states the Chinese psychiatrist in his report to his friends in America.

"The revolution will be based on the Dialectic Materialism. We psychiatric workers in China are encouraged to study and analyze the psychiatric theories and find out how much is materialistically based. Those parts coming from the idealistic viewpoint will be expelled. The general attitude toward Freudian theories sounds unfavorable in the Socialist world."

The present attitude in China toward personality adjustment and criminals is described by the Chinese psychiatrist as follows:

"People are educated to apply mutual criticism and self-confession which are considered to be the most valuable weapons for improving one's personality."

"Thus the law offender is not always imprisoned as before, but he is asked to confess before the public, then is opened to criticism. If he is frank enough and accepts comments heartily, he is considered excusable and hopeful."

"This sort of education has been proved effective elsewhere," the Chinese psychiatrist comments, obviously referring to the Soviet Union and its satellite countries.

He states that even after a number of months he himself is "a little bit confused about the new environment" and finds it somewhat difficult to readjust himself.

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ENGINEERING

Aluminum Prefab Protects Soldiers from Wind, Cold

► COMPLETE protection from 100-mile gales and sub-zero weather is provided for soldiers by a new aluminum prefabricated building developed by the Army Engineer Research and Development Laboratories at Fort Belvoir, Va., in collaboration with Chrysler Corporation.

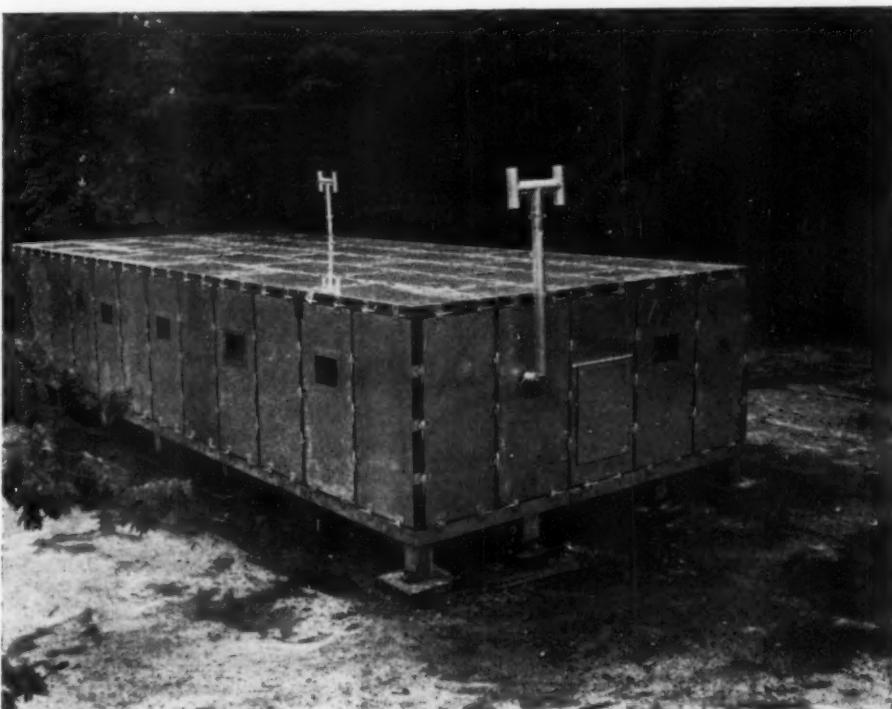
It is a box-shaped structure with flat roof that can be erected quickly in the field. It is 20 feet wide and eight feet high, and can be any multiple of eight feet in length that may be desired. The unit now under tests is 48 feet long.

The prefabricated parts are restricted to approximately 100 pounds in weight for easy handling. The structure utilizes channel aluminum floor beams, and panels for walls, roof and floor made of honeycomb construction. The panels are an aluminum alloy. The inner and outer sheets of the alloy are separated by a craft paper impregnated with a resin and shaped to resemble the familiar honeycomb. This type of panel has both strength and resistance to heat passage.

Panels are held together by simple wedge-type connector pins. No special skill is required for erection; the job can be done by ordinary soldiers. Each unit has its own heating and sanitation facilities. The furnaces are oil-fired and blast-driven. They provide a hot-air heating system. An indoor temperature of 70 degrees Fahrenheit can be maintained even when the outside temperature is 65 degrees below zero.

This building is another example of activities of all branches of the Armed Services in developing suitable structures for servicemen for use in various parts of the world and under various conditions. Ease of erection in forward areas is an essential. The particular weather to be encountered is the number one consideration.

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BUT IT'S SO WARM INSIDE—The aluminum prefabricated hut which can be erected quickly in the field provides complete protection for GIs in sub-zero weather.

MEDICINE

Year's Worst Polio Outbreak May Help Solve Mysteries

► THE little southern town of Wytheville, Va., which has been the scene of the nation's worst polio outbreak this year may help solve some of the mysteries surrounding this feared disease.

No one knows how polio is carried from victim to victim. The unusual prevalence of this disease, 50 times the usual epidemic rate, may give scientists a chance to discover just how it is spread, whether by insects or water or directly from person to person.

Dr. Alexander Steigman, University of Louisville, Ky., professor and consultant to the National Foundation for Infantile Paralysis, has been supervising the collection of insects, blood, water and human wastes in which may be found one of the viruses of infantile paralysis.

The virulence of the disease in Wytheville and the large number of cases may mean that a new type of virus, a fourth sort additional to the now-recognized three types, has attacked this small southern community. Or it may mean merely that the virus causing this outbreak is one to which Wytheville residents have not previously been exposed.

Getting sick with one kind of polio virus does not give protection against infection with another of the polio viruses. That is why people sometimes have a second attack of the disease, and theoretically three attacks are possible.

But it will take weeks of research to discover whether the Wytheville epidemic is going to help solve some of the polio mysteries.

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PSYCHIATRY

No Key for Sister May Mean Marital Troubles

► GIVING the young son his own doorkey while requiring his sister to report in early may be paving the way for later marital unhappiness.

This is the suggestion of Dr. Mirra Komarovsky, of Barnard College, Columbia University, based on study of the biographies of 73 girl college students.

The girls who had brothers reported that the boys in the family were given earlier as well as more frequent chances at independence than were the girls.

In the middle class American home, if these families are typical, the boy is permitted to take his first train ride alone at an earlier age. He goes to baseball games or movies unaccompanied younger. He sets off for school alone at an earlier age. He has greater privacy over his phone calls and letters. And he is permitted to go out in the evening without explaining his absence. His sister, on the other hand, must

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give a strict account, if not required to get permission for absences from home.

This difference in the home training of boys and girls may make it more difficult for the girl after marriage to be independent of her parents, to make her own decisions, or to face the disapproval of her mother in case of any conflict between her and the girl's husband.

It may be why, when the sea of matrimony gets rough, the wife is inclined to "go home to mother."

Dr. Komarovsky urges further research to find out whether the attachment to parents is greater among women involved in family disputes and divorces.

Details of the study are reported in the AMERICAN SOCIOLOGICAL REVIEW (August).

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CHEMISTRY

Atomic Glasses Protect Eyes from X-Rays, Neutrons

► NEW glasses that prevent atomic eye damage have been achieved. For protection against X-ray and neutron radiation from atom smashers, atomic reactors and even atomic bombs, the new transparent materials were developed through research directed by Dr. Alexander Silverman, head of the University of Pittsburgh's department of chemistry.

The world's first neutron-absorbing glass contains cadmium borosilicates with fluorides. Transparent protection for the eyes against slow neutrons given by this new glass is equal to a layer of opaque cadmium a third as thick. Goggles of this glass are expected to guard against cataracts caused by accidental exposure to neutron beams which have affected several scientists in past years.

Another new glass has X-ray-absorbing power 50% greater than the best commercial X-ray shielding glass. Tungsten phosphate produces this effect and the new glass does not discolor on exposure to the high energy X-rays or gamma rays.

People generally might wear such glasses if atomic bomb attack is expected, but they would be especially useful for research workers around cyclotrons, betatrons and other atom smashers.

Dr. Silverman also expects both glasses to be used in thick laminated peepholes in the safety barriers in atomic energy plants. Instruments involving gamma and neutron radiations will also use them.

Goggles can be made with composite lenses to protect against both kinds of radiation or single lenses for one kind only.

Associated with Dr. Silverman in the development of the X-ray-absorbing glass were Dr. Joseph J. Rothermel and Dr. Kuan Han Sun. The research team developing the neutron-absorbing glass consisted of Dr. Silverman, Dr. Sun, Laben Melnick and Dr. Hurd W. Safford.

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IN SCIENCE

MEDICINE

Male Hormone Relieves Pain of Menstrual Periods

► SUCCESS with a method of using male sex hormone to relieve severe monthly pain in women is reported by Dr. William Filler of Jackson Heights, N.Y., and New York University College of Medicine and Bellevue Hospital, in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Aug. 5).

Small doses of the hormone chemical, methyltestosterone, were given by mouth three times a day for six days before ovulation. Part of the success of the treatment, Dr. Filler and associates believe, is due to giving the hormone at this time in the monthly cycle, when the egg is discharged from the ovary. This is about half way between the menstrual periods.

The dose given is well below that which might produce masculinization, such as growth of beard.

Almost three-fourths of the patients, 16 out of 22, got complete relief of pain from this treatment. The other six experienced partial relief. The doctors do not now feel concerned as they did originally about the possibility of interfering with the woman's having babies. Three of the patients became pregnant immediately after stopping the treatment, and there is no evidence that the treatment suppresses discharge of the egg from the ovary.

The treatment is for those women whose pain is not due to any organic disorder nor to psychologic conditions, which cannot be relieved by similar measures, and who are incapacitated each month by the pain.

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VETERINARY MEDICINE

Golden Drug Helps Turkeys' Sinus Trouble

► SINUS trouble in turkeys, an ailment different from that in humans, is the latest bane to fall before the golden-yellow antibiotic aureomycin.

Dr. J. E. Prier of the College of Veterinary Medicine at the University of Illinois reports in the JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION (August) that aureomycin inhibits the agent of infectious sinusitis in turkeys. The agent is believed to be either a virus or another type of germ known as rickettsiae.

Sinus infection in turkey flocks, although not normally fatal, slows the birds' rate of growth and often makes them unfit for market on time.

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SCIENCE FIELDS

MEDICINE

Sex Hormone Treats Diabetic Children

► GOOD results with sex hormone treatment of children with diabetes were reported by Drs. R. Ramos and C. de Nogales of Barcelona, Spain, at the sixth International Congress of Pediatrics in Zurich, Switzerland.

The children, the Spanish doctors reported, needed less insulin when given sex hormones. They recovered from dehydration, acidosis and signs of faulty fat utilization. Their handling of starches and sugar became more stable.

Object of the sex hormone treatment is to suppress the part of the pituitary gland which produces a hormone formerly called diabetogenic, or diabetes-producing. This hormone is now recognized as ACTH, the anti-arthritis hormone. Production of diabetes is one effect doctors have had to guard against in using this hormone for treating arthritis or other conditions. Although the Spanish doctors are enthusiastic over the results of sex hormone treatment of diabetic children, other doctors want to see the results confirmed by work elsewhere.

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DENTISTRY

Radioactive Chemical Aids Tooth Decay Fight

► A RADIOACTIVE chemical is now helping in the fight against tooth decay. Studies with it at the Los Alamos Scientific Laboratory in New Mexico may show whether or not decay can be checked or prevented by substances put on the teeth, such as ammoniated tooth powders and pastes and mouth washes.

The enamel of teeth, the studies show, soaked up the radioactive chemical something like a sponge. This shows that chemicals for checking tooth decay could penetrate the enamel. Other chemicals that may enhance tooth decay also could penetrate the enamel.

The radioactive chemical used in these studies was urea made with radioactive carbon 14. Results are reported by Drs. William Ward Wainwright and Frank A. Lemoine in the JOURNAL OF THE AMERICAN DENTAL ASSOCIATION (August). Urea was used, the scientists explained, because of its potential properties for reducing tooth decay and because of the small size of its molecules. This last makes for greater penetrating power.

The radioactive urea, in water, was spread over the crown surface of 14 human teeth

10 minutes after they were extracted. The degree of penetration was indicated by highly sensitive radioautographs able to record extremely small quantities of the radioactive substance on a special X-ray film.

The scientists found that penetration of the enamel took place rapidly, possibly within 10 minutes. In some of the teeth, the radioactive material, after spreading through the enamel, diffused through the underlying calcified dentin and then entered the pulp of the tooth.

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PLANT PATHOLOGY

Diseased Leaves Absorb Radioactive Sulfur

► THE first experimental demonstration that leaves infected with rust and mildew actually absorb the sulfur that combats the infection has been made with the use of radioactive sulfur, by-product of the atomic bomb.

Farmers and gardeners have used sulfur in various forms to fight fungus diseases, but no one has heretofore determined quantitatively that more of the chemical was concentrated in the rusted and mildewed areas of the leaves.

Drs. C. E. Yarwood and Louis Jacobson of the University of California's divisions of plant pathology and plant nutrition exposed diseased plants to radioactive sulfur 35 obtained from the Atomic Energy Commission. This treatment was lethal to rust or powdery mildew on bean and sunflower leaves but did not harm the plant.

Then the treated leaves were put next to an X-ray film for two days and the radioactive sulfur concentrated in the fungus colonies showed up as exposed areas on this radioautograph film.

This selective absorption by the diseased tissues, the California scientists believe, will explain other cases of chemotherapy in plants and animals without assuming that the disease and the host have a different sensitivity to the curing substance.

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PLANT PATHOLOGY

Leafhopper Culprit Carries Fruit Virus

► A GREENISH-YELLOW leafhopper, about one-fifth of an inch long, has been tracked down as the culprit carrying a fruit tree virus known as western X disease.

Entomologists of the Department of Agriculture, working with the Washington and Oregon agricultural experiment stations, made the discovery. They identified the insect as one *Colladonus geminatus*.

Western X disease injures peaches up and down the west coast, particularly in sections of Utah and Washington. It also hits cherry trees. Until now, no one knew how the disease was transmitted.

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DENTISTRY

Ammoniated Dentifrices May Give Gum Trouble

► A HINT that ammoniated tooth powders and pastes, widely promoted as anti-tooth decay agents, may add to the dental troubles of older persons by causing gum inflammation appears in a report to the JOURNAL OF THE AMERICAN DENTAL ASSOCIATION (August) in Chicago.

The report is from Dr. Maynard K. Hine, dean of Indiana University School of Dentistry at Indianapolis.

One of the well known theories of the cause of tartar is that ammonia is set free in the mouth and that this alkalinizes the saliva, allowing calcium to precipitate from it, Dr. Hine points out.

Tartar, or calculus as dentists term it, is not merely an unsightly thing. When it gets under the gums, these hard deposits may cause serious inflammation.

Studies of the use of ammoniated dentifrices have so far not shown an increase in these deposits. But the best and most careful studies, Dr. Hine states, have been made on children who usually show very little tendency to have these deposits.

"The effect of ammonia-producing dentifrices must be carefully watched," he warns.

It would not be "desirable" to reduce tooth decay at the expense of an increase in calculus in older patients where tooth decay is less common than inflammation and disease of the gums.

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AERONAUTICS

Tunnel to Tackle Plane Boundary Layer Problem

► ONE of the toughest problems in aviation, that of the so-called boundary layer of air next to the plane's fuselage and wings, is to be studied in a new low-speed wind tunnel now being completed at Cornell University.

More specifically, it is to study the rough air called the turbulent boundary layer which causes drag on the plane and decreases speed. The boundary layer is a thin layer of air between the surface of the plane and the outer volume of air through which the plane is passing. It is apt to "break" toward the trailing edge of the wing, creating the turbulence.

This low-speed wind tunnel will have a rough air layer created by a 125-horsepower motor that will produce air velocities of about 75 miles an hour. The air passage is six feet in diameter, and the entire doughnut-shaped steel structure is some 85 feet long and 20 feet wide.

The problem will require five years to solve, it is expected. It will be under the supervision of Prof. William R. Sears.

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PSYCHIATRY

Therapy for World's Terrors

Children bewildered by their present day complex environment receive reassurance coupled with love in the University of Chicago school.

By MARJORIE VAN DE WATER

► TELEVISION and radio scare stories, crowded apartment life and a succession of new gadgets which put mortal danger within the reach of baby fingers make it more and more difficult to be a good parent.

"Love is not enough," says Dr. Bruno Bettelheim, Vienna-born psychiatrist. It must be supplemented by deliberate efforts on the part of the parent to raise children successfully in our present-day complex environment.

The tired parent finds it much harder to put breakable or dangerous things out of the child's reach than to say "No!" or to slap his hands. The result is that frequent and often angry "nos" convince the child this is a world full of incomprehensible dangers where the only safe thing to do is to do nothing, and that to try to find out things for oneself is something bad.

Parents can get many good ideas on how to make the environment of their own home more favorable for mental health in their children from the experience of a special school where emotionally disturbed and mentally ill children are being brought back to health.

In the attempt to bring these sick children back to normal, much is being learned about the situations which have made these little boys and girls feel that life is just too difficult or unhappy to be endured. The school, which is called the University of Chicago Sonia Shankman Orthogenic School, is under the direction of Dr. Bettelheim.

What is done for children in the school and much of what has been learned from the children is reported in a new book by Dr. Bettelheim, "Love Is Not Enough," (The Free Press).

Psychiatric treatment is given to the mentally sick children at the school, but not just in the detached situation of the treatment room. Their problems are handled as they arise in the same situations that produced them.

Bathroom a Battleground

One such charged situation is in the bathroom. The American family bath is apparently a battleground between mothers and children in which the child is often the eventual loser.

Children arrive at the school often the victim either of a compulsive need to be clean so that they are driven into a panic

by the thought of getting so much as a speck on a dainty little white dress, or else a hostility produced by painful scrubings that makes them ready to scream at the thought of washing behind the ears.

No child is forced to wash at the school. They learn first to enjoy sitting in the tub in pleasantly warm water playing with toys. Gradually the idea of washing is introduced as the child is ready not to be disturbed by it.

"What happens around here if you don't brush your teeth?" one child asked seriously, evidently expecting that some disaster or drastic punishment would result. He was told that no one would be much concerned about it but that his teeth might get dirty.

The boy thought that one over and then said, "That's right, they might."

Waking Made Pleasant

Waking up in the morning is a very important moment, it was found at the school. These children have passed a restless night filled with nightmares and terrors. They are not eager to begin a day charged with fears and possible disaster.

So there are no clanging bells to start

the day here, a child is usually awakened by having a candy or a cookie popped into his mouth or placed in his hand. This is a reassurance that the day can bring pleasures as well as disagreeable events and struggles.

Then the children are gently lured into joining in play, at first with little toys placed right on the bed, later with the other children on the floor. Gradually they are fully awake and ready to dress.

Food as a Symbol

The dining table is another "charged" situation. To some children, food is more than just nourishment but a symbol of all pleasures and security.

In addition to three main meals, there are two regular snacks—one at about three o'clock, the other at bedtime. And then there is an endless supply of cookies and candies. Every child is made to feel that he is entitled to bread and butter and milk whenever he wants it, and all he wants, day or night.

Some children want to eat unbelievable amounts of food and hoard secret stores for "emergencies." For others eating is such a misery that they have to learn how to enjoy food.

These children are given whatever they want whenever they want it. If they don't enjoy drinking milk from a glass, they may suck it through a straw or even, in



DESPAIR NOT TABOO—Two boys give up in despair during a class at this unusual school at the University of Chicago. They do not have to pretend to be attentive but can openly show how they feel. The teacher does not chide, but tries always to give the children understanding.



DEFENSE FOR NOCTURNAL TERRORS—Terrors of night haunt all anxious children. They feel better if they have their prized possessions at hand. The boy's animals will keep watch for him during the night.

some cases, take it from a nursing bottle.

Bedtime is one of the most important parts of the day. When it is possible to restore the ability to enjoy ten or more hours of unbroken sleep a long step has been taken toward calming the children's nervous strain, making them less anxious and less tense. For most of the children enter the school with a long history of insomnia and night terrors.

A bedtime snack helps to quiet the children down for the night. Then comes a story, during which some of the children drop off to sleep. But later there is a ritual which must be gone through by many of the youngsters. Some must arrange their clothing, some must count their animals, some must be tucked in in a special way. Nearly all have a special toy with which they must sleep, even the bigger boys and girls. No one laughs at them for it.

Learning Ability Necessary

The treatment of a child is not considered completed until he can learn. He must be able, not only to succeed in the classroom, but to really want to learn on his own and to enjoy the classroom.

Most children enter the school with an active aversion to learning. This may be because of a fear of acquiring knowledge or a fear of competition and of being with other children. At the school, lessons are limited to not more than three and one-half hours in the classroom. There is no homework, no letter-writing or other outside assignments.

On the other hand much of the class time is spent in painting or drawing, in taking care of animals in the schoolrooms, and

playing games when an assignment is finished. Every attempt is made to make learning pleasant and a satisfying experience to the child. He is permitted a good deal of choice in what he will learn, what books he will read.

Once the barriers against learning are overcome, the teachers at the school do not need to worry about the children. On the contrary, they have to be careful that they do not make too rapid progress and leave children of their age behind.

With small classes, individual attention and learning geared to the child's inclinations and abilities, most children easily make two or more years' academic progress in a single year's time.

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AGRICULTURE

South's Land Will Rival Midwest's Loam

► THE Deep South, land of cotton and tobacco, will some day be a competitor of the black loam belt of the Midwest in growing corn, hogs and cattle, a Department of Agriculture official predicted in Raleigh, N.C.

New knowledge of pasture crops and soils has brought profitable livestock enterprises to many areas of the South, Dr. Robert M. Salter, chief of the Bureau of Plant Industry, Soils and Agricultural Engineering, said at North Carolina College of Agriculture's annual farm and home week.

Boosts in the amount of feed crops able to be grown on Southern soils through scientific management, Dr. Salter reported, make feasible a livestock industry in the South three times its present size. This would mean the conversion to forage crops—clovers, grasses and legumes—of millions of acres of non-productive land, he said.

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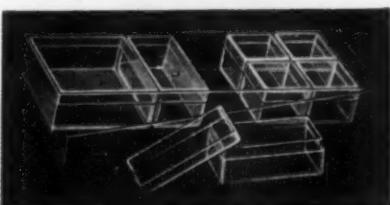
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CHEMISTRY

Rubber Reconversion Easy

► IF all-out mobilization comes, the United States will be on a much bouncier footing than it was 10 years ago. The nation will switch with hardly a pause from trees in Malaya to refineries in Texas for one vital war need—rubber.

Tires from chemicals were the magic made real in the '40's.

When the Japs overran the Malayan Peninsula, Singapore and the Dutch East Indies in the first weeks after Pearl Harbor, a genuine rubber scare resulted in the United States. Then the wheels of peace and war depended almost completely on natural rubber.

There was a rash of proposals and cure-all ideas. A decade earlier, Thomas Edison had made headlines with his method for obtaining rubber from giant goldenrod.

The guayule plant similarly would give rubber, up to 20% of its own weight. By March of 1942 the government began planting thousands of seedlings of this scrawny, shriveled-up bush. By 1946 it hoped to have a respectable return of rubber from its guayule plantations.

But the country could not wait for guayule, or goldenrod, or rabbit brush, or the Russian dandelion called "kok-saghyz" which kept the Red war machine rolling. Desperately the U.S. began building synthetic rubber plants, utilizing the chemists' knowledge of how to make passable rubber from oil and coal.

Butadiene and styrene were the principal ingredients. Butadiene from petroleum or alcohol, styrene from coal. From these, big molecules could be built of little molecules, and the result was rubber.

In 1941 the U.S. had previously made only some 8,000 tons of synthetic rubber. By 1945, a million tons a year could be turned out by the mixing plants. It was called GR-S—Government Rubber-Styrene. It was known also as Buna-S.

Other synthetics were developed for special jobs: Buna N for bullet-proof gas tanks, neoprene, thiokol and butyl. By the end

of the war, these were nearly as good for countless jobs as natural rubber.

Then, in 1946 and 1947, came cold rubber. It was made of the same materials as Buna-S. Mixed at 41 degrees Fahrenheit with new bonding agents, however, it had greater toughness and resiliency. It made the U.S. forever independent of the Hevea tree, source of natural latex in lands far away. Cold rubber tires are better.

By the end of last year, 150,000 tons of cold rubber alone could be made annually by government-operated plants. In June, three more synthetic plants from World War II were put back into operation. Their addition gave the U.S. 18 such plants in use, with nine others in standby.

If once again the rubber plantations of Asia are cut off, Uncle Sam will be able to turn quickly to the chemists' magic of making rubber tires by mixing liquids in giant tanks.

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MEDICINE

Sliced-Off Finger Stuck Back, Changes Fingerprints

► PART of a finger sliced off and stuck back on 37 years ago has now healed up so that the finger is normal. But the fingerprint still shows the evidence of the healing of the graft.

This new evidence of how hard it is for criminals to fake their fingerprints was reported in the scientific journal *NATURE* (July 15) by Dr. Cyril John Polson of the department of forensic medicine, School of Medicine, in Leeds, Eng.

The finger slicing occurred not to a criminal, however, but to a young woman whose identity is hidden behind the initials, "A. D. S." A. D. S. also did the grafting and is quite proud of her work, especially since her physician at the time did not believe it would heal.

She lost the slice off her finger in a fruit slicing machine, quickly recovered the piece from the blade of the machine and replaced it on her finger. She had the presence of mind to "match the finger grain" on her finger. Then she bound the piece in place with a bandage wet with Friar's Balsam, a household remedy of a generation ago. For some weeks she left the bandage in place and kept it moist with the tincture.

Although a fingerprint taken recently shows that she succeeded in matching perfectly the pattern of her fingerprint, a faint mark reveals where the graft healed. Dr. Polson reports that "it is unlikely that even skilled surgery would leave less trace than this."

Only previous record of a successful graft

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of the skin of a finger, according to Dr. Polson, was reported more than 50 years ago by Sir Francis Galton. This case also was one of self-surgery. But Galton's subject, a young man, in his haste to slap the slice from his thumb back in place, put it back at right angles to its original position. His finger ridges were therefore shifted around in subsequent fingerprints.

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METEOROLOGY

From Inside or Out, New Atlas Describes Clouds

► WHAT a cloud looks like from an airplane—from above, from inside and from just below—will become a much more important part of weather forecasters' data when the new International Cloud Atlas is completed in 1952. It will contain an extensive section describing different types of clouds as they look to observers in planes.

The expansion of a very small section on plane observations in the last atlas, published in 1932, was approved at a recent meeting in Paris of the Committee for Study of Clouds and Hydrometeors of the International Meteorological Organization, Dr. Charles F. Brooks, director of the Blue Hill Observatory and American representative on the committee, told Science Service.

The International Cloud Atlas is one of the most important tools of the weather forecasting trade. It enables observers all over the world to agree on specific descriptions of clouds and it enables forecasters to know exactly what kinds of clouds the observers are reporting.

Observation of clouds from planes is becoming much more common throughout the world because it is much easier to determine the true altitude, the shape and the extent of the cloud from a plane than it is from the ground. Also the airborne observer can give the forecaster some idea as to whether the cloud is composed of liquid or ice particles.

Second major improvement, which was just about completed at the Paris meeting, was in the definitions of the 10 types into which meteorologists have divided clouds. The 13 members of the committee tightened up the definitions and described distinct limits between different types of clouds. Photographs to illustrate what they meant by their definitions were selected.

Science News Letter, August 12, 1950

AGRICULTURE

Preserve Fresh Grape Flavor for Concentrates

► A WAY of preserving the volatile flavor essences of grape juice has been developed by U. S. Department of Agriculture scientists. The extracts are said to give a new

grape juice concentrate the characteristic taste of freshly-squeezed grapes.

Grape juice thus promises to join the booming field of canned fruit-juice concentrates, most successful of which has been frozen concentrated orange juice. The new process for treating Concord grapes was devised at the government's Eastern Regional Research Laboratory in Philadelphia.

Science News Letter, August 12, 1950

Exposure to excessive sunlight lowers, for a time, the sensitivity of eyes to light; night-driving after sunbathing is dangerous.

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► ACCORDING to ancient custom in England the swan has the status of a royal bird, and swan-keeping is a royal prerogative. Under certain conditions the Crown will grant the privilege of keeping swans, together with a "swan mark," a mark similar to a cattle brand which is cut into the bird's upper bill for identification.

The swans seen on the Thames bear the swan mark of the king and of two guilds, the Dyers Company and the Vintners' Company. Once a year all Thames swans are collected in a ceremony known as "Swan-Upping," and the young cygnets are marked and their flight feathers are cut.

This royal bird, the mute swan, is a native of Europe and Asia. It was introduced into North America as a domesticated bird to adorn parks and estates in the European manner. In the course of time individuals have escaped from domestication, and by now the mute swan has become established to some extent in the East, notably in the Hudson Valley.

Despite its name, the mute swan is capable of making sounds. It can sound a re-

sounding trumpet call and when aroused it hisses angrily.

The two native American swans are the trumpeter swan and the whistling swan. The trumpeter, largest of all swans, reaches a length of more than five feet, measured from bill to tail with the neck stretched straight as in flight. It is the most publicized of the swans in this country because of the heroic fight being made to save it from extinction.

Although trumpeters once existed in great numbers here, the steady development of the land has slowly driven it towards the vanishing point. Small numbers of wild trumpeters in Canada and a few hundred which seem to be thriving on government wildlife refuges in the West represent the last slim hope that this magnificent bird will survive.

MEDICINE

Tension in Blood Pressure

► EMOTIONAL tensions are an important factor in the development of high blood pressure, many research physicians believe. Evidence for this view is piling up.

A group of University of California School of Medicine researchers have reported the following findings in a paper in the *AMERICAN JOURNAL OF MEDICINE*:

1. Of a sampling of patients with high blood pressure, 75% had unique personality patterns which differed distinctly from those of well persons and patients with other illnesses.

2. Dizziness, headache, fatigue and other symptoms often believed to result from high blood pressure usually preceded by many years the discovery of the existence of the disease.

These findings pose the possibility that the high blood pressure developed as a result of long-standing emotional conflicts which probably were responsible for the symptoms.

For whatever consolation it may be if the trumpeter becomes extinct, its call has been recorded for posterity. In 1937 Dr. A. A. Allen captured two cygnets and then made a transcription of the ensuing rescue by the two parents, complete with cries of distress from the youngsters, the reassuring honks of the parents and then finally the swanly hubbub of happy reunion.

The whistling swan is about ten inches shorter than the trumpeter, and gets its name from the shrill sound, not really a whistle, uttered by the migrating flock. The whistler breeds in the far Arctic north. This fact plus its habit of extremely high flight and a strong innate wariness seems to account for the whistlers' marked success in surviving on this continent which man has rendered so inhospitable for so many other creatures.

Science News Letter, August 12, 1950

The scientists described their group of patients as emotionally inhibited people who are dominated by an overstrict conscience which binds them in an "emotional straight-jacket." A strong sense of pride moves such people to hide their conflicts from other people and even from themselves.

The California group also claimed that the presence or absence of emotional stress influenced the course of the disease. They confirmed earlier observations that even the discussion of an emotion-charged problem raises the blood pressure of a person with high blood pressure much higher than it does the pressure of an unaffected person.

The scientists who made the study are Dr. Maurice Sokolow, assistant professor of medicine; Dr. Samuel P. Hunt, clinical instructor in psychiatry; and Dr. Robert E. Harris, associate professor of medical psychology.

Science News Letter, August 12, 1950

AERONAUTICS

How Slow Can a Plane Be?

► WIND tunnel with a reverse twist: How slow, not how fast, will an airplane fly?

To find out just how slow, light liaison aircraft are being tested in a specially designed wind tunnel at the University of Wichita in Kansas.

This slow-speed flight research indicates that planes may be able to fly as slow as 20 miles an hour. At that air speed a plane headed into a 20-mile-an-hour wind could hover like the present-day helicopter.

Under the direction of Prof. Kenneth Razak, head of the school of engineering, the study is being made primarily for the United States Navy for application to carrier-

type planes, including jets. The information obtained will, however, apply to other aircraft.

Flight speed is decreased by putting slots in both the leading and trailing edge of the airplane's wings. The flow of air through these slots and over the flaps reduces the speed of the aircraft. The same lift and increased control are maintained with the use of slots.

Present day carrier-type aircraft with a landing speed of approximately 80 miles per hour could be landed on the deck of a carrier at 60 miles per hour if wing slots were used, Prof. Razak believes.

Science News Letter, August 12, 1950

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Books of the Week

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AMPHIBIANS OF WESTERN CHINA—Ch'eng-Chao Liu—*Chicago Natural History Museum*, 400 p., illus., \$7.50. A monograph defining and describing the species of salamanders and frogs which the author found in the Chinese region bordering on Tibet. Many valuable illustrations including several color plates.

BOTANY FOR GARDENERS—R. P. Faulkner—*Scribner*, 236 p., illus., \$3.50. A background of general knowledge with emphasis placed on plant physiology and its practical application. Written for the amateur by a British author.

BRITAIN 1949-50: A Reference Handbook—Central Office Of Information, London, 204 p., paper, free upon request to the British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. Data on aspects of British life such as communications, industries and social services.

CALCULATING INSTRUMENTS AND MACHINES—Douglas R. Hartree—*University of Illinois Press*, 138 p., illus., \$4.50. A summary of progress in the development and use of high-speed computing devices. Intended for the users of such instruments as mathematicians, physicists and engineers.

COMMERCIAL FEEDING STUFFS: Report on Inspection 1949—H. J. Fisher—*Connecticut Agricultural Experiment Station*, Bull. 539, 136 p., illus., paper, free upon request to publisher, New Haven, Conn. An inspection of commercial feeding stuffs in Connecticut as to their ingredients.

DAIRY SCIENCE: Its Principles and Practice—W. E. Petersen—*Lippincott*, 2nd ed., 695 p., illus., \$5.00. Designed primarily as a college text for students of dairy production.

THE EARLY CULTURES OF NORTH-WEST EUROPE—H. M. Chadwick Memorial Studies—Sir Cyril Fox and Bruce Dickins, Eds.—*Cambridge University Press*, 441 p., illus., \$11.50. Twenty-two essays written by pupils of Professor Chadwick in his honor.

EIGHTH SEMIANNUAL REPORT OF THE ATOMIC ENERGY COMMISSION, JULY 1950—Gov't. Printing Office, 230 p., paper, 55 cents. Control of radiation hazards is exhaustively reported in the first portion of this book. It is in effect a handbook upon this subject. See *SNL*, Aug. 5, p. 83.

FIELDS OF PSYCHOLOGY: Basic and Applied—J. P. Guilford, Ed.—*Van Nostrand*, 2nd ed., 779 p., illus., \$5.00. Outstanding authorities present brief introductions to their respective fields. This edition has been revised to include some of the latest advances.

A FRAMEWORK FOR LONG-RANGE AGRICULTURAL POLICY—Oscar Heline and Donald R. Kaldor—*National Planning Association*. Planning Pamph. No. 72, 68 p., paper, 50 cents. Presents the authors' views on long-term peace-time agricultural goals and ways to achieve them.

A GERMAN AND ENGLISH GLOSSARY OF GEOGRAPHICAL TERMS—Eric Fischer and Francis E. Elliott—*American Geographical Society*, 111 p., \$3.00. Compiled to aid the American geographer to read German literature.

IDEAS & MEN: The Story of Western Thought—Crane Brinton—*Prentice-Hall*, 587 p., \$6.00. A brief history of western culture.

INTERIOR DESIGN—J. R. Shipley—*Small Homes Council, University of Illinois*, Circ. Series Index No. H1.O, rev. ed., 8 p., illus., paper, 10 cents. Suggestions for making a low-cost house as livable as a large home.

LIST OF Sires PROVED IN DAIRY-HERD-IMPROVEMENT ASSOCIATIONS, 1950—Division of Dairy Herd Improvement Investigations, Dept. of Ag.—*Gov't. Printing Office*, 279 p., paper, 60 cents. The names and summarized "proved-sire" records of 4,356 sires whose records were tabulated by the Bureau of Dairy Industry between Jan. 1, 1949 and Jan. 1, 1950.

MAYA HIEROGLYPHIC WRITING: Introduction—J. Eric S. Thompson—*Carnegie Institution of Washington*, Publ. No. 580, 347 p., illus., paper: \$7.00, (cloth: \$7.50). Report of research on the geographical and cultural setting for the Maya hieroglyphic writing. Many valuable illustrations.

MENTAL TESTS IN CLINICS FOR CHILDREN—Grace H. Kent—*Van Nostrand*, 180 p., \$2.45. The author emphasizes that tests should be adapted to the child; with his interests, his handicaps, and his attitude toward the testing situation taken into account. Primarily an auxiliary textbook for advanced students in clinical psychology.

METALS AND ALLOYS—Technical Staff of "Metal Industry"—*Chemical Publishing Co.*, 214 p., \$5.00. A reference book listing in tabulated form the composition of some 4,600 alloys. Useful to metallurgists, engineers, chemists and buyers and salesmen of metals.

MINIONS OF THE MOON: A Novel of the Future—William Gray Beyer—*Gnome Press*, 190 p., \$2.50. A science fiction novel concerning the rebirth of civilization thousands of years in the future.

MODERN GLASS WORKING AND LABORATORY TECHNIQUE—M. C. Nokes—*Chemical Publishing Co.*, 157 p., illus., \$3.75. Instructions are given for the working of new glasses such as Pyrex. Of British origin.

NUTRITION: In Health and Disease—Lenna F. Cooper and others—*Lippincott*, 11th ed., 744 p., illus., \$4.00. A basic text brought up-to-date.

ORGANIC CHEMISTRY—Louis F. Fieser and Mary Fieser—*Heath*, 2nd ed., 1125 p., illus., \$7.50. A standard organic chemistry text brought up-to-date.

PHARMACEUTICAL EMULSIONS AND EMULSIFYING AGENTS—Lawrence M. Spalton—*Chemical Publishing Co.*, 132 p., illus., \$3.75. Presents the practical details relating to the large number of emulsifying agents now available for use in pharmacy. Primarily for the practising pharmacist and student of pharmacy. Of British origin.

THE PHILOSOPHY OF MATHEMATICS—Edward A. Maziarz—*Philosophical Library*, 286 p., \$4.00. A brief history of the origin and nature of mathematical reasoning and the author's

theory on how to integrate this information in the total pattern of scientific and philosophical thinking.

PRACTICAL GYNECOLOGY—Walter J. Reich and Mitchell J. Nechtow—*Lippincott*, 449 p., illus., \$10.00. A guide to the techniques of office gynecology, including systematic routines of examination, laboratory tests, biopsy, cytology, diagnosis and management of commonly seen disorders.

PRIMARY BATTERIES—George Wood Vinal—*Wiley*, 336 p., illus., \$5.00. Presents a wealth of information on primary batteries, including a chapter on standards of electromotive force. The author was for 32 years responsible for the maintenance of the standard volt at the National Bureau of Standards.

THE PSYCHOLOGY OF MENTAL HEALTH—Louis P. Thorpe—*Ronald*, 747 p., illus., \$5.00. A college text on mental hygiene.

RADIATION HAZARDS OF RADIOACTIVE ISOTOPES IN FIRE EMERGENCIES: An Introductory Report, June 1950—*International Association of Fire Chiefs*, 10 p., paper, 25 cents.

SAINTS, SINNERS AND PSYCHIATRY—Camilla M. Anderson—*Lippincott*, 206 p., \$2.95. An attempt to clarify the basic motivations which dominate human activity and to relate overt manifestations of personality to the basic subconscious drive. For those dealing professionally with behavior problems.

A SALESMAN'S HANDBOOK COURSE IN HUMAN ENGINEERING—Guthrie E. Janssen, 48 p., illus., paper, \$1.00. To aid in making salesmanship more effective and mutually profitable for salesman and customer.

SCIENCE AND THE LAND: The 70th Annual Report of the New Jersey Agricultural Experiment Station, 1948-49—*Rutgers University Extension Service*, 159 p., illus., paper, 50 cents to non-residents of New Jersey, to residents of New Jersey free upon request to publisher, Rutgers University, New Brunswick, N. J.

SOLUTIONS TO THE PROBLEM OF MERCHANDISE PICKUP AND DELIVERY IN BUSINESS DISTRICTS—U. S. Chamber of Commerce, 24 p., illus., paper, 10 cents.

SUITABILITY OF VARIOUS SOILS FOR TUNG PRODUCTION—Matthew Drosdoff—*Gov't. Printing Office*, 23 p., illus., paper, 10 cents.

A TEXT-BOOK OF INORGANIC CHEMISTRY—J. R. Partington—*Macmillan*, 6th ed., 996 p., illus., \$3.75. A college text brought up-to-date. Of British origin.

Science News Letter, August 12, 1950

ORNITHOLOGY

Discover New Race of Tanagers

► ITS legs are white instead of black, and its belly is bright blue. With these clues, the Chicago Natural History Museum announced that it has discovered a new race of tanagers. The bright-hued bird's home is in the arid savanna of Brazil's Goyaz Province. At least the museum thinks it is. The only known specimen was collected 20 years ago. Given a faulty identification, the dead bird has reposed since 1930 in the Chicago Natural History Museum.

Science News Letter, August 12, 1950

• New Machines and Gadgets •

For addresses where you can get more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 529. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

DRINK COOLER, which chills the liquid as it is being sipped through the device, is a tube of aluminum, with special mouth-piece, containing a sealed-in refrigerant. Prior to use, the tube is put in the freezing compartment of the refrigerator, and its content allowed to freeze solid.

Science News Letter, August 12, 1950

ADJUSTABLE STOPPER for the picnic jug can be made to fit most jugs by a twist of the fingers, making the stopper larger or smaller. Made of aluminum and rubber, it provides an air-tight, leak-proof seal, and it imparts no taste or odor to the jug's contents.

Science News Letter, August 12, 1950

TROUBLE-FINDER, for use in the automobile repair shop, resembles the doctor's stethoscope, having similar ear pieces and holder but with an electric probe at the outer end. Grasping the probe by its plastic handle, the point is pried over the seeming trouble area until the clearest sound is heard.

Science News Letter, August 12, 1950

PLASTIC GUIDE strips for the typewriter, shown in the picture, separate the finger groups of keys so that the novice at typing learns easily which finger to use for



each key. The strips will fit any standard typewriter, and are easily attached.

Science News Letter, August 12, 1950

PENCIL to mark glassware is made of tungsten carbide, replacing the former diamond marker. This metal alloy is cheaper than the diamond but ranks next to it on

the hardness scale. The tungsten carbide pencil comes to a definite point rather than an edge as found in the diamond tip.

Science News Letter, August 12, 1950

WATER STERILIZER, for home-to-hotel uses, is an automatic, electrically-operated ultraviolet device which kills disease-carrying contamination by ultraviolet radiation. Purification takes place in a stainless steel tank in the water line. The tank contains four ray tubes.

Science News Letter, August 12, 1950

PORTABLE LIGHT METER, designed for measuring street lighting of low intensity but usable indoors, is overnight-bag in size, and is ready for instant use. The detector, containing a light-sensitive cell, is set on the street surface, while the indicator is held in the hand.

Science News Letter, August 12, 1950

AUTOMATIC CLOSET LIGHT, easily installed by the home-owner, comes complete in a unit containing lamp, switch, and a flat cord to pass under the closet door to an electric outlet. The switch and light box is fastened by screws in an upper corner of the door frame. When the door is open the light is on.

Science News Letter, August 12, 1950

Do You Know?

Palm trees may become a future source of sugar.

Pig's toe-nails have been ground into powder to make tobacco fertilizer.

One of the most useful forms of carbon is the graphite brush that connects moving and stationary parts of electrical devices.

More actual days of service for a suit or coat will result if the garment is worn for one day, then "rested" the next, according to a textile expert.

Toads and frogs often can be distinguished by their skin; toads are largely land animals with dry and bumpy skin while frogs are generally aquatic and have smooth moist skin.

In the fission atomic bomb, the type already used, the heaviest chemical elements are used, uranium and plutonium; in the fusion process of the proposed hydrogen bomb the lightest element would be used.

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